Assessing the Efficacy of Structural Merger Remedies: Choosing Between Theories of Harm?

by

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Abstract: Previous empirical assessments of the effectiveness of structural merger remedies have focused mainly on the subsequent viability of the divested assets. Here, we take a different approach by examining how competitive are the market structures which result from the divestments. We employ a tightly specified sample of markets in which the European Commission (EC) has imposed structural merger remedies. It has two key features: (i) it includes all mergers in which the EC appears to have seriously considered, simultaneously, the possibility of collective dominance, as well as single dominance; (ii) in a previous paper, for the same sample, we estimated a model which proved very successful in predicting the Commission's merger decisions, in terms of the market shares of the leading firms. The former allows us to explore the choices between alternative theories of harm, and the latter provides a yardstick for evaluating whether markets are competitive or not – at least in the eyes of the Commission.

Running the hypothetical post-remedy market shares through the model, we can predict whether the EC would have judged the markets concerned to be competitive, had they been the result of a merger rather than a remedy. We find that a significant proportion were not competitive in this sense. One explanation is that the EC has simply been inconsistent – using different criteria for assessing remedies from those for assessing the mergers in the first place. However, a more sympathetic – and in our opinion, more likely – explanation is that the Commission is severely constrained by the pre-merger market structures in many markets. We show that, typically, divestment remedies return the market to the same structure as existed before the

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proposed merger. Indeed, one can argue that any competition authority should never do more than this. Crucially, however, we find that this pre-merger structure is often itself not competitive. We also observe an analogous picture in a number of markets where the Commission chose *not* to intervene: while the post-merger structure was not competitive, nor was the pre-merger structure. In those cases, however, the Commission preferred the former to the latter. In effect, in both scenarios, the EC was faced with a no-win decision.

This immediately raises a follow-up question: why did the EC intervene for some, but not for others – given that in all these cases, some sort of anticompetitive structure would prevail? We show that, in this sample at least, the answer is often tied to the prospective rank of the merged firm post-merger. In particular, in those markets where the merged firm would not be the largest post-merger, we find a reluctance to intervene even where the resulting market structure is likely to be conducive to collective dominance. We explain this by a willingness to tolerate an outcome which *may* be conducive to tacit collusion if the alternative is the possibility of an enhanced position of single dominance by the market leader.

Finally, because the sample is confined to cases brought under the 'old' EC Merger Regulation, we go on to consider how, if at all, these conclusions require qualification following the 2004 revisions, which, amongst other things, made interventions for non-coordinated behaviour possible without requiring that the merged firm be a dominant market leader. Our main conclusions here are that the Commission appears to have been less inclined to intervene in general, but particularly for Collective Dominance (or 'coordinated effects' as it is now known in Europe as well as the US.) Moreover, perhaps contrary to expectation, where the merged firm is #2, the Commission has to date rarely made a unilateral effects decision and never made a coordinated effects decision.
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1. Introduction

For markets where dominance is found, the EC intervenes either by prohibiting the merger outright or, more commonly, requiring a remedy. Typically the remedies are structural, requiring the divestment of certain assets.[1] The starting objective of this paper is to identify the impact of the remedies imposed for a sample of mergers, in terms of the market structures which would result from the remedies, and to ask whether those structures are likely to be conducive to competition.

This responds to an issue raised by Motta *et al.* (2003) and Motta (2004), who point out an important potential trade-off inherent in structural merger remedies. Antitrust authorities need to ensure that a sufficiently viable competitor to the merged entity results from the divestment in order to prevent the merged entity establishing a dominant position. This involves either ensuring a substantial package of assets is divested and/or that the purchaser of the assets is already established in the market. However, this can be at odds with a second objective, avoiding collective dominance (CD) as a result of the remedy. The conventional wisdom is that CD (tacit collusion) is more likely with more symmetric firms (see, for example, Ivaldi *et al.*, 2003). If so, a remedy that creates a large viable competitor may also increase the likelihood of tacit collusion by creating/increasing symmetry between the buyer and the merged firm. Motta *et al.* (2003) correctly argue that most of the EC focus appears to have been on the first of these objectives, ensuring a viable competitor, while largely ignoring the possibility that the remedies might create a market structure which is subsequently conducive to CD (see also Compte *et al.*'s (2002) criticism of the EC decision in the Nestle/Perrier merger in 1992).

The two most comprehensive previous empirical remedy studies (by the US Federal Trade Commission (1999), as well as the EC's (2005) own evaluation

[1]The EC's 2000 Notice on Remedies states a preference for remedies involving the divestiture of a stand-alone business (Monti (2003)). In addition, from a sample of 229 mergers from 1991-2005 in which the EC imposed remedies, Bougette and Turolla (2006) classify 71% of the remedies as at least partly structural. However, see for example Rey (2003) and Papandropoulos and Tajana (2006) for a discussion of the relative merits of behavioural over structural remedies.

study) have indeed evaluated the efficacy of structural remedies largely in terms of subsequent viability of the divested assets.[2] In the EC's evaluation, it is argued that requiring a sufficiently large package of divested assets may be essential to the success of the remedy.

The key idea of the present paper, on the other hand, is that structural remedies should be evaluated in terms of their impact on the competitive structure of the markets concerned, and that, as suggested by Motta (2004), this evaluation should apply the same theories of harm as used to assess the mergers in the first place, namely Single Dominance (SD) and Collective Dominance (CD). Motta (2004) argues that, ideally, a merger should be cleared subject to remedies only if neither SD nor CD is expected to result post-remedy. With this objective, we return to the sample of mergers first used in Davies *et al.* (2008) to explain EC merger decisions and now assemble a database of the remedies imposed, and estimate, where possible, the market structures resulting from those remedies. In order to assess whether those structures are likely to be conducive to competition, we run them through the estimated structural model of Davies *et al.* (2008), previously used to identify the Commission's underlying model of whether the mergers themselves were anticompetitive in the first place. In other words, we apply the same model of harm to the structures implied by the remedies as was applied when judging the mergers.

Strikingly, a significant proportion (47%) of the resulting market structures are in areas not conducive to competition, in the sense that they would have been remedied had they been the result of a merger. One interpretation of this result is that the Commission has been inconsistent – not applying the same model in designing remedies as that which it uses to assess mergers. However, a more sympathetic interpretation of this result is possible, and, in our opinion, justified.

[2] See Papandropoulos and Tajana (2006) and Lévêque (2007) for more detailed summaries of the findings of the EC study, and Baer and Redcay (2003) for the US study. But see also Duso *et al.* (2007), who take an alternative approach by employing an event study methodology.

This sympathetic interpretation starts by asking what is a reasonable objective to set for merger remedies, in terms of competition? Clearly, in an ideal world this would be to ensure a competitive market structure. However, as Davies and Lyons (2007, in particular, p.34 and p.44) suggest, in reality a competition authority (CA) is largely constrained in doing no more than restoring the market to its pre-merger level of competition. There is a potential ambiguity in how this is treated in the EC's own merger remedy guidelines,[3] which state that a merger can be cleared following commitments by the parties (i.e. remedies):

> that are proportional to and would entirely eliminate the competition problem. (para. 1)

It is not clear whether the 'competition problem' here refers only to a problem caused directly by the merger, or whether it allows for a problem which may already have existed prior to the merger. Moreover, if the latter, whether the objective of the remedy is also to remove that prior problem. The guidelines go on to state that:

> Where a concentration leads to the creation or strengthening of a dominant position, the parties may seek to modify the concentration in order to resolve the competition concerns raised by the Commission and thereby gain clearance of the merger. (para. 5)

Here, arguably, there is more of an implication that the objective of the remedy is confined to removing any anticompetitive effect of the merger, but it remains open to interpretation. The US DoJ's antitrust division policy guide to merger remedies are less equivocal:[4]

> Although the remedy should always be sufficient to redress the antitrust violation, the purpose of a remedy is not to enhance premerger competition but to restore it.[5]

On balance then, we interpret the stated objective, on both sides of the Atlantic, to one of removing the competition concerns caused by the merger, if unremedied.[6] The upshot is that it is unlikely that remedies can do more than

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[3] Commission Notice on remedies acceptable under Council Regulation (EEC) No 4064/89 and under Commission Regulation (EC) No 447/98: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2001:068:0003:0011:EN:PDF.

[4] Similarly for the UK, the Competition Commission's guidelines (2008, p.15) describe the pre-merger status quo as the starting point when considering potential remedies.

[5] US DoJ, Antitrust Division Policy Guide to Merger Remedies: http://www.usdoj.gov/atr/public/guidelines/205108.pdf , p.3.

[6] Moreover, as Davies and Lyons (2007) discuss, not only is this the reality for CAs, but also the academic literature suggests that there may be other reasons why intervention beyond restoring the status quo may be undesirable – for

restore the market to its pre-merger structure. A problem arises if the pre-merger structure is not itself competitive in the first place. As we argue, this is precisely the problem faced by the EC in this context – hence our sympathetic interpretation.

The starting point for this paper is an econometric model (Davies *et al.*, 2008), previously estimated for a sample of mergers, 1990-2004, where collective dominance (tacit collusion) was considered as a serious issue by the European Commission (EC) in at least one market covered by the merger. In each of these mergers, the EC reveals in its decision document that it has considered the possibilities of both single dominance (SD) and collective dominance (CD) within the same merger – typically for different markets in the same merger. The econometric model achieved a high predictive power in explaining the EC's decisions on whether or not to intervene in each market, and if to intervene, whether for SD or CD. The model therefore reveals the structural conditions under which the Commission believes that different theories of harm can occur. We now use this same model to evaluate the competitiveness of the markets post-remedy.

When tracking the structural remedies imposed in this sample, we find that they typically involve either a prohibition of the entire merger or, more often, a divestiture of the overlap created by the merger in the market of concern (an effective prohibition). The divested assets are then typically purchased by an entrant, and, in effect, the market structure (in terms of the size distribution) is returned to its pre-merger position. We also show that this pre-merger position is itself often (about one third of cases) not conducive to competition. Moreover, amongst those in which the Commission actually intervened, the proportion is nearly a half. Given then that the typical remedy entails a return to the status quo, and that, very often, that status quo was itself anticompetitive, it is unsurprising that structural remedies will often return the market to an uncompetitive structure.

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example, harming incentives for firms to propose efficient mergers (Farrell (2003)). However, this does not exclude the possibility that, in order to help ensure the viability of the divested asset, the required divestiture package may include assets covering markets where no competition issues have been identified. Typically, for this reason divestiture of an ongoing business is preferred (see Baer and Redcay (2003) and Winckler (2003)).

This leads us to our second major objective. Precisely because both the pre-merger and post-merger outcomes will often involve anticompetitive market structures, the decision of whether or not to intervene often requires a choice between two alternatives, neither of which is ideal. Aggregating across all markets (i.e. including those in which the EC did and did not intervene), there are 53 cases where both the prospective merger and the status quo entailed structures which might be deemed anticompetitive: in 40 it chose to intervene, but in 13 it chose not to.

Section 5 goes on to explore how, in these 53 cases, the Commission *chooses between* potentially anticompetitive structures. We begin by first underlining what is now widely accepted to have been a weakness in the ECMR before it was revised in 2004. Up to that revision, the Commission had only one tool available should it wish to intervene on the grounds of non-coordinated behaviour: Single Dominance. However, this required, as a necessary condition, that the merger would bestow, or reinforce, a number 1 ranking on the merged entity. Other mergers with possibly deleterious unilateral effects were effectively beyond intervention (the so-called 'gap' cases). Some commentators have argued that, on some occasions, this may have led the Commission to intervene, by, erroneously, arguing a Collective Dominance theory of harm.

We explore these possibilities by returning to our 2008 model, and now revising it by taking into account the rank of the merged entity. We find that for a given post-merger market structure, the Commission is less likely to remedy on the grounds of CD if, post-merger, the merged entity would be the number 2 firm. We explain this reluctance to intervene in such cases in terms of the Commission's willingness to tolerate an outcome which may be tacitly collusive if the alternative is a weakened number 2 firm which is less able to counteract the singly dominant position of the market leader. In that special sense, it is as if the Commission prefers possible collective dominance to single dominance.

Finally because our 2008 paper, and the above work on remedies, is confined to mergers only up to 2004, in section 6, the paper goes on to ask how, if at all, these conclusions require qualification following the 2004 revisions to the ECMR. Here, it should be recalled that the revisions armed the Commission with an extra tool – to intervene against Unilateral Effects even when the merged firm is not the single dominant firm. We identify a further comparable post-2004 sample of 19 mergers (covering 334 markets). Here, a very striking picture emerges. It appears that, since the 2004 revision, the Commission has become more reluctant to intervene in general – in the sense that structures which would have attracted intervention pre-revision, no longer did post-revision. This is true both for Single Dominance, but even more so for Collective Dominance. Perhaps unexpectedly, there appears to be a continued reluctance to intervene when the merged entity is not the market leader. The sample period here is only three years, and definitive conclusions are somewhat premature, but the provisional conclusion must be that the revised ECMR has caused a major, and benevolent, re-think on what constitutes an uncompetitive market structure.

2. Assessing the Competitiveness of Markets

The initial purpose of this paper is to evaluate the effectiveness of remedies – not only in removing any competitive harm implied by the merger, but also in yielding a post-remedy market structure free of competitive harm. As will become apparent, the two are by no means identical objectives.

In order to do this, we need some means for evaluating the competitiveness of a market, and for this purpose we return to the structural model of dominance in EC merger decisions in Davies *et al.* (2008). There, we identified a sample of 62 mergers over the period 1990 until mid 2004 (i.e. up to the May 2004 revision of the EC Merger Regulation), in which the Commission seriously considered the possibility that collective dominance (CD) might be a potential outcome. In the event, it actually intervened in only 25 of these mergers: in 4, the merger was prohibited and in 21 it was allowed to proceed, subject to remedies being imposed in one or more of the markets covered by the mergers. Davies *et al.* argue that only in this sample of mergers, where an intervention occurred in one or more markets, is it possible to isolate the EC's structural model of SD and CD. This is because only within this reduced sample is it possible to control for important market characteristics such as barriers to entry, absence of buyer power, price transparency etc (referred to as X market characteristics) which they view as necessary conditions for finding dominance.[7]

The 25 mergers covered 222 different markets, of which 29 involved intervention for collective dominance, and 89 for single dominance.[8] In the remaining 104 markets no intervention was deemed necessary. In each of these mergers, the Commission reveals in its decision document that it has considered the possibilities of both SD and CD – typically for different markets in the same merger.[9] Note that remedies are rarely required in all markets covered by the same merger (except in the extreme case of outright prohibition), and it is common to find, for a given merger, non-interventions and interventions, and different types of intervention.

For this sample of 222 markets, Davies *et al.* estimate a model which successfully distinguishes the three decisions the Commission can make on the likely effects of the merger in a particular market: collective dominance (CD), single dominance (SD) or non-intervention (NI). The econometric model is multinomial logit, using only information on the hypothetical[10] post-merger market shares of the two largest firms (S1 and S2). These are used to construct two explanatory variables: SUM (S1+S2) and RATIO (S2/S1)). It is

[7] This argument relies on an assumption referred to as X-homogeneity: all markets covered by a given merger share the same X market characteristics. If this assumption holds, then the decision to intervene in some markets in a particular merger but not in others can be explained by structural conditions rather than X market characteristics. See Davies *et al.* (2008) for more detailed discussion and empirical evidence supporting this assumption.
[8] There are 14 markets in the sample where the EC finds CD between a group of firms that are 'structurally linked' in some way (usually shareholdings). In these cases the EC essentially views these firms as a single entity. Here, following Davies *et al.* (2008), we combine the shares of the linked firms and treat them as SD decisions.
[9] By construction, the sample includes all mergers where collective dominance might have been an issue in at least one market covered by the merger. In the event, in many of these mergers, it intervened in some other markets on the grounds of single dominance.
[10] Throughout the paper, all post-merger market shares are hypothetical in two senses: the post-merger share is assumed to be the sum of the merging parties' pre-merger shares, and assuming, for this purpose, that the merger is not blocked/remedied.

worth noting that S1 is typically, but not always, the post-merger market share of the merged entity, a point to which we return in section 5.

These two variables are both strongly significant at the 99% level in both the equations for SD and CD. They also have the expected signs, indicating that interventions are more likely in concentrated markets (high SUM) and, for CD, in symmetric markets (high RATIO) but for SD in asymmetric markets (low RATIO). The model successfully explains 79% of all decisions. Figure 1 displays the predicted decisions graphically, and Table 1 shows the different possible outcomes implied, depending upon the size of the number 1 and 2 ranked firms.[11]

Figure 1: Predicted Theories of Harm as Revealed in EC Merger Decisions (Davies et al., 2008)

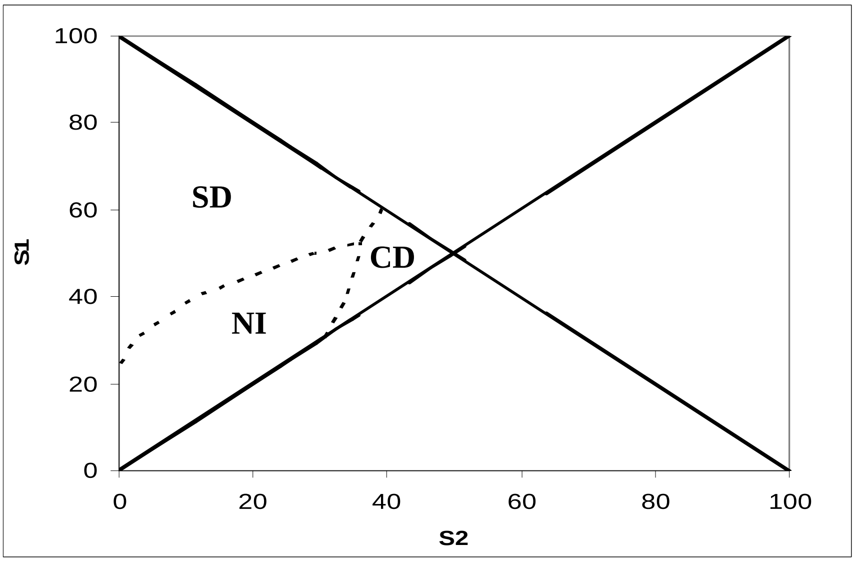

Table 1: Possible Outcomes at Different Sizes for S1 and S2

	Different outcomes according to size of S2		
S1 (%)	**NI**	**CD**	**SD**
45	18 < S2 ≤ 35	35 < S2	S2 ≤ 18
55		37 < S2	S2 ≤ 37
65			For all S2

[11] The predicted decision is the one to which the estimated model attaches the highest probability.

Thus, when the #1 ranked firm has a very large post-merger market share (>65%), the model predicts that the Commission will always decide SD. However, at lower values for S1, the decision also depends crucially on the size of S2 post-merger. For example, at S1=55%, while the Commission will always judge the structure to entail dominance, this will be single dominance if S2 is relatively small, but collective dominance if S2 is relatively large. Perhaps most interesting is where S1=45% - again S2 is crucial, but here all three outcomes can occur, depending on S2: where S2 is 'large', the EC opts for a CD decision; where S2 is 'small', it opts for SD; but for intermediate S2, it opts for NI. Interpretation of this intermediate range anticipates a key issue later in the paper. It implies that there are some cases where the #2 firm is sufficiently large to counteract the otherwise dominant position of the leader, but not sufficiently large to result in collective dominance (i.e. the resulting size asymmetry rules out tacit collusion).

Since this model achieves a high predictive power in uncovering the Commission's implicit structural model, we will also use it here to classify the competitiveness of any market structure. Hereafter, we refer to any market structure as 'dominant' if (S1, S2) implies location of the market in the SD or CD regions in Figure 1. Otherwise, structures are referred to as 'competitive' – when (S1, S2) lies in the NI range.

3. Competitiveness of Pre- and Post-Merger Market Structures

As discussed above, the pre-merger structure is likely to be an important restriction on the powers of a CA to intervene. Therefore, we begin by assessing the competitiveness of the pre-merger market structures: this is only possible for 174 of the 222 markets.[12]

Table 2 reports the results of applying this structural model to assess the 'competitiveness' of each of these markets, using estimates of what S1 and

[12] In the other 48, the EC's decision document only reports the merged entity's aggregate post-merger market share rather than the separate shares of the merging parties.

S2 were both before the merger (PRE) and post-merger (MERGER). While PRE always refers to 'actual' shares, MERGER refers to hypotheticals – what *would* have happened, absent any remedy imposed, and assuming that the merged firm's share was the sum of the parties' pre-merger shares.

Table 2: The Competitiveness of Structures Pre- and Post-Merger

'Competitiveness'	PRE	MERGER
Competitive	120 (69)	82 (47)
Dominance (Dom)	54 (31)	92 (53)
Total	174	174

Percentages shown in brackets

Two points are obvious from the table. First, as might be expected, without remedy/prohibition, these mergers would have led to market dominance in a sizeable proportion (53%) of markets. But second, and less expected:

> ***FINDING 1(a):*** *even before the mergers, 31% of markets presented structures consistent with a dominance*

This establishes a point which is key to the rest of the paper: the EC will often be constrained in securing competitive outcomes post-remedy by a starting point which is already 'anticompetitive'. We pursue this first, in section 4, for the subset of cases where the EC actually intervened, by exploring the remedies imposed. In section 5, we then return to the full sample by reintroducing those markets where there was no intervention.

4. The Intervened Markets and the Impact of Structural Remedies

Within the 174 markets for which we have both PRE and MERGER data, the EC actually intervened (by remedy or prohibition) in 92, and in 40 of these, pre-merger structures were already anticompetitive:

> ***FINDING 1(b):*** *in 44% of all markets in which the EC intervened, pre-merger structures displayed even before the mergers*

4.1 The Remedy Sample

We now follow this sample of interventions by examining the remedies imposed: identifying the nature of remedies, and, where structural, the scale of divested assets and the identity of the purchasers.

In the event, we have been able to extract useable data on remedies for only 17 of the above 25 mergers, accounting for 66 markets,[13] with interventions designed to counteract CD in 23 cases and SD for 43 cases. All remedies examined are structural.[14]

4.1.1 Scale of Divested Assets

Six of the mergers (accounting for 30 relevant markets), were prohibited, in all markets, by the EC, or the merged parties abandoned the merger; and, in these cases, of course, markets were essentially returned to their pre-merger structures. In the other 36 markets, various assets were divested: in 23 cases, the market share of the divested assets was equal to the market share of one of the merging parties (typically the smaller party); in 9, the divested assets were smaller than the size of the smaller party, and in only 4 cases the divested assets were larger than the size of the smaller party. This leads to:

> ***FINDING 2(a):*** *the 'typical' divestment remedy (in 80%=53/66 of cases) returns the market share of the merged entity to the pre-merger share of the larger of the parties.*[15]

4.1.2 Identity of the Purchaser

In only one of the mergers was the purchaser of the divested assets already present in the market concerned.[16] In all others, it was an entrant,[17] and in

[13] Requirements that the merging parties should identify an up-front buyer of the divested assets are becoming increasingly common, in the EC and especially in the US (see Baer and Redcay (2003) and Wincker (2003)). However, over the time period covered here, it has not always been possible to identify the purchaser or the precise pre-merger market structure.

[14] Often some behavioural conditions were imposed in addition to the required divestiture. In a few cases purely behavioural remedies were accepted, but these are not analysed here.

[15] In addition, even when the purchaser of the divested assets was already present in the market of concern this firm's gain in market share was not sufficient to take this firm into the top 2 ranked firms. Therefore, in all 53 cases S1 and S2 return to their pre-merger levels.

[16] However, this one covered 17 different markets (M.3314 Air Liquide/Messer Targets).

these cases it follows that the market structure (in terms of the firm size distribution) post-remedy will be very similar to the pre-merger structure. Indeed, in the special case, where the divested assets are identical in size to those of one of the parties, the two market structures will be identical. Since the same is also true, of course, for outright prohibition of the merger, it follows that:

> ***FINDING 2(b):*** *the most common outcome (in 67%=44/66 of cases) of a structural remedy is to return the market to the exact pre-merger structure.*

Davies and Lyons (2007) refer to this outcome as "prohibition within the market" since, even if the merger is not prohibited in all markets, such a remedy in a particular market implies a return to the status quo structure in that market.[18] For present purposes, this confirms that the status quo pre-merger market structure will typically play a central role.

4.2 Efficacy of the Remedies

Table 3 reports the results from applying the structural model to the market structures resulting from the remedies imposed in these 66 markets.

Table 3: The Competitiveness of the Post-Remedy Outcomes

Post-remedy outcome	**Frequencies**
Dominant	31/66
of which:	
PRE= dominance, MERGER=dominance	*25*
PRE= competitive, MERGER = dominance	*4*
PRE= competitive, MERGER= competitive	*2*

The first row yields:

[17] 'Entrant' here denotes a new player in the specific market (member state and product) concerned. Very often, these firms are already present in the same market but in different countries and/or in adjacent product markets. Arguably the EC views such purchasers as less risky (Oldale (2002)). However, this may also increase multi-market contact and increase the likelihood of tacit collusion (see Motta *et al.* (2003)).

[18] This is consistent with the merging parties offering to prohibit the merger in markets where the EC identifies a problem in order to get it cleared quickly in all other markets; see Farrell (2003) and Lyons and Medvedev (2007) on the bargaining process over remedies between the merging parties and the CA.

> ***FINDING 3***: *In nearly half (47%=31/66) of cases, divestment remedies have resulted in structures which the Commission would have sought to remedy had they been the result of a merger, rather than a remedy.*

One interpretation of this finding is simply that the Commission has been inconsistent in the criteria it applies (i) when assessing a merger in the first place, and (ii) when agreeing remedies with the parties. However, Finding 2(b) suggests a more 'sympathetic' interpretation. This is that the Commission is largely constrained by not being able to impose a remedy which does more than return the market to its pre-merger status quo. If that status quo was itself characterised by dominance, then so too will be any structure attainable by a viable remedy as Table 3 shows this occurs in 25 of the 31 cases which resulted in dominance post-remedy.

5. Choosing Between Anticompetitive Structures/Theories of Harm

Even if we are to accept this 'sympathetic' interpretation, there remains the question: "in choosing an 'unsuccessful' remedy (which returns the market to an uncompetitive pre-merger status quo), why does the Commission prefer this over the structure (also uncompetitive) which would have resulted had it left the merger unremedied? But equally, we should also pose the parallel question: are there yet other cases where the Commission prefers ***not*** to remedy because it judges an uncompetitive post-merger structure to be preferable over an uncompetitive pre-merger status quo?

The second question is easily answered: returning now to the 82 markets in which the Commission did *not* intervene, there were indeed 13 in which both the PRE- and POST-MERGER market structures implied dominance, according to our structural model.

If we now combine these non-intervention cases with the 92 intervention cases analysed in the previous section, there is a total of 53 markets (58%) in which both PRE- and POST-MERGER structures implied dominance (Table

4). Thus, in all these markets, the Commission was effectively faced with an implicit choice between anti-competitive market structures.

Table 4: All markets: Cases with Pre- and Post-Merger Dominance

		MERGER	
		Competitive	**Dominance**
PRE	**Competitive**	81	39
	Dominance	1	53

> ***FINDING 4:*** *of the 53 cases where both the prospective merger and the pre-merger structure entailed dominance, in 40 the Commission chose to intervene, and in 13 it chose not to (see also Table 5).*

The remainder of this section attempts to identify on what basis these choices were made. In particular, we are interested in the possibility that the Commission reveals an implicit preference for one theory of harm over another.

First, it is important to recall that this particular sample was deliberately confined to the years preceding the revision of the ECMR in 2004. Up to that revision (1990-2004), the Commission was constrained in how it could deal with non-coordinated effects – its only tool was to intervene on the grounds of Single Dominance (SD). However, SD necessarily required that the number 1 ranked firm (#1) was involved. It follows therefore that, although the Commission might be able to equate a given market structure with SD if #1 was involved, it could not if the merged firm was #2. In these circumstances (which are possible examples of what is often referred to in the policy literature as 'gap' cases; see section 6), under the old ECMR the only possible grounds for intervention would be under a Collective Dominance (CD) theory of harm.

It is likely, therefore that, insofar as the choice between anticompetitive structures might also entail a choice between SD and CD, the rank of the merged firm might be important. On the one hand, a judgement of SD could only be brought for #1 firms, but on the other hand, there might have been a tendency to make CD judgements more frequently for #2 firms – if CD was used as a surrogate for non-coordinated effects where a #2 firm is involved. In fact, it is clear (Table 5) that the rank of the merged firm in these cases is an extremely good predictor of whether the EC will intervene: the probability of intervention is 95% where #1 is involved, but only 15% for #2. On this basis, there is little evidence of the surrogate CD hypothesis.

Table 5: Decisions by Firm Rank in PRE- and POST-MERGER Cases of Dominance

Merged firm rank	Intervention	Non-intervention
#1	38	2
#2	2	11

But to examine this role of firm ranking more rigorously, we now return to the structural model of our earlier paper (2008). It should be noted that the model used the hypothetical market shares of the two largest firms post-merger, making no distinction by their identity, i.e. the merged entity may be #1 or #2. Here, however, we re-estimate the model separately for two sub-samples, distinguishing whether the merged firm was #1 or #2 (Table 6). Where the merged entity is #1 post-merger, as before, the EC has a choice between NI, SD and CD and so multinomial logit estimation remains appropriate; however, as just explained, when the merged entity is #2 post-merger, the choice set is restricted to NI and CD, and therefore binary probit estimation is used.

Table 6: Re-estimation of the Structural Model, Distinguishing the Rank of the Merged Firm

	I	**II**
Sample	**ME = #1**	**ME = #2**
N	176	46
SD		
SUM	0.111** (0.0186)	
RATIO	-5.925** (2.128)	
Constant	-3.859** (0.848)	
CD		
SUM	0.142** (0.0272)	0.0403** (0.0120)
RATIO	10.609** (3.267)	2.984* (1.071)
Constant	-18.623** (3.545)	-6.028** (1.400)
Pseudo R^2	0.567	0.236
LL	-73.2	-17.4
Wald Chi^2	101.83**	20.84**
EC decisions correctly predicted:		
ALL (%)	85	87
SD (%)	87	n.a.
CD	80	44
NI (%)	84	88

Estimated standard errors in parentheses, ** indicates significance at 99% level, * at the 95% level. Equations are estimated with observations clustered by merger, and are corrected for any heteroscedasticity.

Figure 2 illustrates these results graphically, as in Figure 1 above, but to aid understanding, it is depicted in two alternative forms. Thus, in 2(a), the vertical axis represents the post-merger share of the merged entity, *regardless of its rank*, and the horizontal axis shows the share of the largest outsider. So the area below the diagonal depicts cases where the merged entity is #2 post-merger. Clear asymmetries are apparent between the two sides of the diagonal: not only is SD tautologically non-existent for #2, but also the CD area is notably smaller – intervention on the grounds of SD impossible, and the probability of CD intervention much reduced.[19]

[19] Interestingly, the CD area above the diagonal is almost identical to the CD area as estimated in our earlier paper (see Figure 1). For example for S1=45, CD is now predicted if S2>32, and for S1=55 if S2>39, compared to S2 greater than 35 and 37 respectively using the earlier model (see Table 1). This is reassuring, given our claim there that this correctly identified the Commission's view of the ranges of size (a)symmetries which are conducive to tacit

Figure 2: Revised Areas of Harm, Taking Account of Rank of Merged Firm

(a) merged entity on vertical axis (b) #1 firm on vertical axis

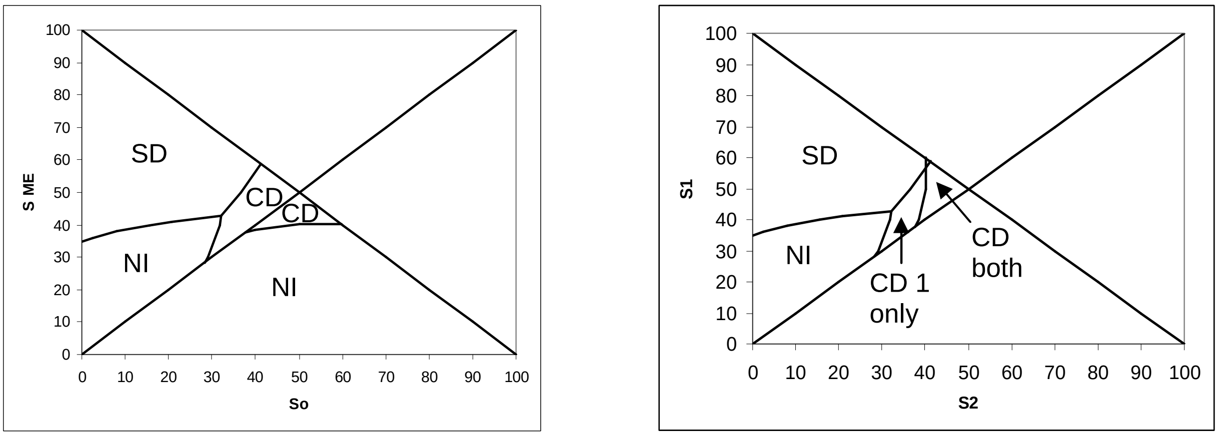

Figure 2(b) represents the picture using the convention of Figure 1, with the vertical axis measuring the share of #1 post-merger, and the horizontal showing #2, *regardless of identity*. This demonstrates clearly that the CD area is notably larger when the #1 firm is the merged entity – indeed, the area below the diagonal is neatly nested in the area above the diagonal. This allows us to denote by ***CD1only***, the area where the EC finds collective dominance only if the merged firm is #1 post-merger, and ***CDboth***, the area where it finds collective dominance regardless of rank. As a numerical example, a post-merger market structure of (40,30) is consistent with collective dominance, but (30,40) is not. This leads to:

> ***FINDING 4****: for a given post-merger market structure, the Commission is less likely to remedy on the grounds of Collective Dominance if, post-merger, the merged entity would be the # 2 firm.*

Finding 4 thus confirms that there is no support for the hypothesis that, under the old ECMR, the Commission might sometimes have used CD as justification for intervention where a lessening of competition was likely to occur *without* coordinated behaviour, but where the merger could not be prevented on SD grounds.

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collusion. As we argue in the text, this range will be underestimated by the area *under* the diagonal because, when the merged firm is #2, the EC tries to balance the possibility of tacit collusion against the risk of otherwise strengthening a position of single dominance for the market leader.

Indeed, Finding 4 raises the contrary question of why is the EC *less* likely to intervene against CD when the merger does not involve the market leader? We believe that the answer lies in the sort of impact any structural remedy might have in these circumstances. Clearly it is unable to reduce the size of the leader, but it can reduce market share symmetry, and thus help to reduce concerns of collective dominance. However, in that case, the remedy imposed on a #2 firm leaves the market leader unchanged, and moves the market closer to a position of SD, in that the leader is less constrained by a sizeable #2 firm, than would be true if the remedy were not imposed (see Table 1).

In order to explore this possibility, we now focus in more detail on those sample markets located in the ***CDboth*** and ***CD1only*** in Figure 2b. First, in ***CDboth*** markets, the EC does typically intervene for collective dominance (3/4 and 4/5 where the merged entity is number 1 and 2 respectively), but in ***CD1only***, collective dominance decisions are rare (3/9) when the merged entity is #2[20] and much more common (13/17) when #1. This is as suggested by the econometric results.

In addition, and as a test of the above hypothesis, we then use the SD equation reported in Table 6 to predict the probability of SD, using PRE-merger market shares (for those markets with pre-merger data available). This therefore allows us to assess the impact of any intervention requiring a return to the status quo, i.e. as in a typical structural remedy.

Table 7: Pre-Merger Structures of Markets Located in *CD1only* Post-Merger

	Predicted probability of single dominance PRE-MERGER		
Rank ME	**Mean**	**range**	**Std Dev**
1	0.10	0.02-0.18	0.07
2	0.46	0.18-0.90	0.26

[20] These three cases outside the predicted CD area when the merged entity is the number 2 firm help to explain the relatively low number of correct CD predictions in Table 6 equation II.

As can be seen, in those markets in this area where the merger involves #2, any remedy involving a return to the status quo will, on average, return the market to a position of single dominance with a probability of nearly 50%, as compared to only 10% if the merged firm is #1:

> ***FINDING 5:*** *for those market structures in which the EC (typically) intervenes on the grounds of collective dominance if the merged firm is #1 but not #2, the predicted probability of single dominance PRE-merger is significantly lower.*[21]

The result is certainly consistent with our hypothesis that non-intervention is based on the possible countervailing effects of the merger on the market leader's singly dominant position. This is in spite of the possibility that the larger share of #2 may be more conducive to tacit collusion.[22] In this sense, the Commission implicitly prefers the possibility of collective dominance (if it does not intervene) to the possibility of single dominance (if it does intervene by requiring divestments which return the market to its status quo.)

Furthermore this preference (for the possibility of collective dominance) would be reinforced if the Commission believed there was any doubt about the medium-term viability of the divested assets. This possibility can not be ruled out, given the findings of the EC's own remedy study (2005, pp.129-30), where it reports that the market share of the divested businesses had decreased in 44% of cases 3-5 years later (as opposed to increasing in only 18% of cases). In contrast, for the business retained by the merged entity, the market share increased in 47% of cases (decreasing in only 33%) over the same period of time. This implies that any remedy that returns a market to a pre-merger position close to SD may over time move even closer to an SD position as the market share of the divested asset declines, further justifying a decision not to intervene.[23]

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[21] A t-test shows that the mean probability of SD pre-merger when the merged entity is #2 is significantly higher than when it is #1 ($p<0.01$).

[22] Ideally, further evidence to support this explanation could be obtained by examining only those markets in this area where the merged entity is the number 2 ranked firm and comparing the probability of SD in the cases where no intervention occurred with the few where the EC did intervene. The latter should, according to our explanation, be those with a lower probability of SD pre-merger. This clearly has not been possible here due to the restricted sample size.

[23] As Papandropoulos and Tajana (2006) point out, the decline in the market share of the divested business is also consistent with intense competition from the merged entity. However, Farrell (2003) demonstrates that for the merged

6. Post-2004 Change in the Merger Regulation

Thus far, this paper has been concerned with merger decisions and remedies only up until the revision of the ECMR in mid-2004. As explained earlier, it has been argued (for example, Motta (2004) and Vickers (2004)), that, over this period, a certain class of mergers might have been left un-remedied, in spite of potential consumer harm, because they did not create a dominant firm or increase the possibility of coordinated behaviour. It is argued that, under the old ECMR, it was difficult for the EC to intervene in such cases – often referred to as 'gap' cases. But it has also been alternatively suggested that the Commission may have attempted to intervene in such cases by inappropriately applying a collective dominance theory of harm. Motta (2004) cites the EC prohibition of the Airtours/First Choice merger[24] in the late 1990s (subsequently overturned by the appeals court) as a possible example.

The revisions introduced in May 2004 established a 'significant impediment to effective competition' test for merger regulation,[25] and *inter alia* this was perhaps a means for closing the gap. Under this test, interventions still remain possible on SD grounds, but now the Commission also has an extra tool – to intervene against Unilateral Effects (UE) *even when the merged firm is not a singly dominant firm*. Thus, this additional tool might facilitate interventions for non-coordinated behaviour even when the merged entity is not #1 in the market.[26]

To explore what impact the revised regulation has actually had on decisions, this section extends the sample of mergers examined until mid-2007. This identifies a further 19 mergers (covering 334 markets) which meet the criteria used for the previous sample: decision documents reveal that CD/coordinated effects (CE)[27] were seriously considered in the case. As before, in order to

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entity and the buyer of the divested assets there may be joint incentives to reduce the value of the divested assets, especially when the buyer is already incumbent in the market.

[24] M.1524 Airtours/First Choice.

[25] There is in fact some debate over the extent to which the revisions to the ECMR represented a substantive change rather than simply a clarification of the scope for intervention in merger control; see Röller and Mano (2006) who suggest that the new ECMR continues a pre-2004 trend towards a more effects-based merger policy.

[26] The new ECMR also now explicitly recognises the possible of an efficiency defence.

[27] Under the new ECMR typically CD cases became referred to as coordinated effects and cases brought on non-coordinated grounds as unilateral effects with still also the possibility of finding SD.

control for the unobservable X market characteristics (section 2), we focus only on those mergers in which the EC actually intervened in one or more markets.

In fact, interventions for CE [28] have been extremely rare: in only three markets.[29] It is unclear to what extent this can be directly attributed to the revision itself, especially as two important appeals court decisions may have lessened the Commission's appetite for making CD/CE decisions.[30] In any event, the small number is certainly consistent with the argument that the burden of proof is higher for CE than UE (Kühn (2001) and Baxter and Dethmers (2006)). Surprisingly, even in the few cases where CE was found to be a problem, in two it was coupled with a finding of UE in the same market (treated as UE/CE decisions in the analysis below).[31]

To examine these new cases in the light of the earlier findings, Table 8 cross-tabulates the Commission's decisions against the predicted decisions under the old ECMR – computed by inserting the hypothetical post-merger S1 and S2 into the equations of our re-estimated structural model in Table 6.[32] The first rows show all cases and the later rows show results disaggregated by whether the merged firm is #1 or #2. So, for example, the EC did not intervene in 219 markets, while our model predicts that, under the old regime, only 160 of these would be non-intervention decisions; 40 would have been SD, and 19 CD.

[28] Excluding structural links cases see footnote 8, plus mergers involving shipping lines were also omitted due to difficulties obtaining reliable market share figures.
[29] M.3916 T-Mobile Austria/Tele.ring and M.4141 Linde/BOC discussed in Davies *et al.* (2008) where the sample of cases under the new ECMR is restricted to May 2004 to mid-2007, plus M.4753 Antalis/Map in late 2007.
[30] The EC's decisions in M.1524 Airtours/First Choice and M.3333 Sony/BMG were overturned on appeal (See Baxter and Dethmers (2006) and Lyons (2008)).
[31] M.3916 T-Mobile Austria/Tele.ring (see CRA International (2006) for more detail on this case), and M.4141 Linde/BOC.
[32] In contrast to Röller and Mano (2006), we do not attempt to classify decisions which the document refers to as SD/UE between SD and UE. This distinction is often unclear in the decision documents, and as explained by Baxter and Dethmers (2005) is often in reality merely a question of semantics. For our purpose here, it is unnecessary to make the distinction.

Table 8: Comparing Actual Decisions under the new ECMR with the Model's Predicted Decisions under the old ECMR

	Predicted under old ECMR			
Actual under revised ECMR	**Total**	**NI**	**SD**	**CD**
All cases				
NI	219	160	40	19
UE	112	7	100	5
CE	1	0	0	1
UE/CE	2	1	1	0
Total	334	168	141	25
(a) ME = #1				
NI	153	96	40	17
UE	109	4	100	5
CE	1	0	0	1
UE/CE	2	1	1	0
(b) ME = #2				
NI	66	64	\	2
UE	3	3	\	0
CE	0	0	\	0

From the aggregate figures, the key points to emerge are as follows:

- In aggregate the Commission has chosen to intervene far less frequently under the new ECMR (34%=115/334) than would be predicted under the old ECMR according to our model (50%=166/334). This is partly due to an increased reluctance to find UE rather than SD (34%=112/334 rather than 42%=141/334), but mainly due to the almost complete absence of CD (or CD/UE) decisions (1%=3/334 rather than 7.5%=25/334)

- Not only are coordinated effect (CE) judgements rare – only three in total, but in two of these cases, the judgement is coupled with unilateral effects (UE), see below

Focusing on those cases where the merged entity would have been ranked #2, it becomes clear that:

- o There are now no decisions of coordinated effects, although there would have been two under the old ECMR; however

- o This is is not because of a willingness to employ the additional UE tool, which has actually been used in only three cases[33]

Overall then, for this sample of cases at least, it appears that:

> ***FINDING 6:*** *The Commission has been less inclined to intervene in general, but especially for cases that might have been deemed collectively dominant, however there is no real evidence that this has been due to a substitution of unilateral effects for collective dominance decisions where the firm is ranked #2.*

Since we have currently have no information on the remedies imposed in these cases, it is difficult to draw any definitive conclusions about how far these results can be explained in terms of the trade-offs between post-merger and pre-merger structures. In the absence of this, the most striking conclusion is the increased reluctance to make *any* sort of intervention.

Finally, the three cases where CE was found merit some discussion, even though it would be wrong to draw any definitive conclusions on such a small number. Rather surprisingly, in two of these, the decision was that the merger would lead to either CE or UE. Superficially, this suggests that the availability of an extra possible theory of harm might make the Commission rather more inclined to intervene. However, the aggregate figures just discussed suggest that this is not so. Furthermore, the use of both theories of harm simultaneously seems strange: firstly, that there is typically a trade-off between the two (see for example Kühn (2001) and secondly, under the more effects-based approach allowed under the new ECMR, selecting the *appropriate* theory of harm for the market concerned should surely be of critical importance. Whether the merger has a counteracting effect as

[33] This finding is similar to those of Baxter and Dethmers (2005) and Röller and Mano (2006) for their different samples.

opposed to making tacit collusion more likely will depend upon the nature of competition expected to prevail post-merger. This in turn will depend in part upon the characteristics of the market e.g. the degree of transparency.[34] These two particular cases are also significant in that, in both, the role of a maverick firm is stressed. Here the EC appears to use the term 'maverick' to refer to firms with substantial available capacity and which operate aggressive pricing strategies.[35] It is argued that as a result of the merger between the maverick and a rival this maverick role will be reduced/cease. Evidence from the sample of cases before the change in the ECMR suggests that the role of maverick firms in CD cases was extremely rare. It is also apparent that post-2004 the role of maverick firms appears to not be restricted to just CE analysis but surprisingly has also been applied when considering potential UE.[36]

7. Implications and Applicability

We have drawn three main conclusions within this paper. First, merger remedies (including prohibitions) will not necessarily return a market to a competitive structure. In practice, the state of competition in the market pre-merger will often constrain how much can be achieved by a competition authority if and when it remedies a merger. A corollary is that there may sometimes be an argument for not intervening in a seemingly anticompetitive merger if the pre-merger market structure was also anticompetitive. Both these possibilities appear to occur quite frequently in the sample investigated here. In order to make this point, we have, necessarily, employed a particular sample of mergers and a particular empirical model defining what constitutes an anticompetitive structure. Both the sample and model might be contested, but the general proposition remains valid. Mergers should always be assessed, not only in terms of their likely impact on competition, but also in terms of the potential limits on what might be attainable by intervention.

[34] In fact Röller and Mano (2006) suggest that there is evidence that, post-2004, market characteristics has played an increased role in EC merger decisions.

[35] In the T.Mobile/Tele.ring mobile phone merger this was in part made possible by Tele.ring's low installed customer base.

[36] In the discussion of the T.Mobile/Tele.ring merger in CRA International (2006) it is suggested that the use of a maverick firm argument was out of place in the UE analysis.

Second, when deciding whether or not to intervene, a competition authority will sometimes have to choose the lesser of two evils, and sometimes this may involve weighing up the likely harm involved from unilateral versus coordinated effects (and the respective probabilities that they will occur). In this particular paper, we have used the ECMR, as it was up to 2004, as our case study, but again the proposition should be quite general. As it happens, in this case, we argue that the EC's decisions suggest that they seem to have preferred the possibility of collective to single dominance, especially when the merger involves a firm which would be ranked #2. We suggest that this is because, while a strengthened number 2 firm may increase the chances of tacit collusion, it might alternatively act as a counteracting force, constraining the power of an otherwise dominant market leader.

Third, we have argued that the revision of the ECMR might have been expected to affect the choices made by the Commission, not least because it was now able to intervene on the grounds of unilateral effects even when the merged firm would be #2. In the event, the apparently overriding effect, at least in the first three years after revision, has been to reduce the incidence of all types of intervention, but especially for coordinated effects.

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